Cumulative Intervention Intensity in Speech-Language Pathology Treatment Plans

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Abstract

Purpose: To examine the extent to which intervention intensity parameters are present in speech-language pathology treatment plans in educational and medical settings.

Method: 120 treatment plans (46 educational and 74 medical) from northern Minnesota and northwestern Wisconsin were examined for intervention intensity parameters specified by Warren and colleagues (Warren, Fey & Yoder, 2007).

Results: Educational records: 65% specified dose frequency and 28% specified total duration. Medical records: 69% specified dose frequency and 55% specified total duration. No treatment plans recorded all intervention intensity parameters.

Conclusion: It is possible that (a) dosage parameters may not be well-known among practicing SLPs and/or (b) therapists may already document intervention intensity but not systematically within the treatment plans. If speech-language pathologists documented intervention intensity in one document, SLPs and researchers may have more resources to provide evidence-based practice for clients.

Keywords: dosage parameters, evidence-based practice, intervention intensity, speech-language pathology, treatment plans

Cumulative Intervention Intensity in Speech Language Pathology Treatment Plans

Imagine suffering from persistent migraines, you decide to seek medical help and receive a medicinal prescription from your physician. You pick it up and pay for it at the pharmacy. When you open the package, you look at the bottle and see that it has no label. There are no directions for how many pills you should take. It is not clear if you must take it with a meal nor how many times a day you might need it. And you wonder how many weeks you should continue your routine. After researching, you find that there is a lack of research about the drug you purchased. Clearly, you wouldn't trust a prescription without a specified dose nor the physician who gave it to you.

It is beneficial that medicinal intervention methods have a long history of undergoing research and documentation of dosage before going on the market (Piantadosi, 1997). Researchers and physicians maintain communication through side-effect documentation. Physicians walk the tight rope of prescribing a dose large enough to help the patient and small enough to minimize chance of overdose and harmful side effects. Meticulous documentation about how a myriad of people react to certain chemicals allows researchers to formulate appropriate recommendations for specific populations. There is growing effort to apply the specific dosage parameters used in pharmacological interventions to behavioral interventions (Yoder, Fey, & Warren, 2012).

The American Speech-Language-Hearing Association (ASHA) urges speech-language pathologists (SLPs) to prescribe evidence-based treatment plans. An evidence-based plan balances scientific research, the SLP's expertise, and the client's goals (ASHA, 2017). Researchers depend upon practicing SLPs to document dosage, or intervention intensity,

parameters so that they may effectively compare intervention methods. There is a concerning lack of intervention intensity parameter documentation in speech-language pathology and the field might improve research methods if SLPs used pharmacology dosage methods as a model for clinical and research practice (Parker-McGowan, Chen, Reichle, Pandit, Johnson, & Kreibich, 2014). Although SLP intervention is predominantly about modifying behavior and is therefore more abstract than medicinal therapy, intervention intensity, the dosage of speech-language pathology, is still important because it may provide a foundation to compare therapy methods.

Without a common operating definition of intervention intensity, it is challenging to truly compare multiple intervention methods in speech-language pathology (Parker-McGowan et al., 2014). For example, imagine that two different children receive intervention for the same disorder. After 6 months of meeting one-on-one with an SLP every day for one hour a day, Child A demonstrates greater improvement than Child B. Although the results suggest that the intervention for Child A is more effective, this may not actually be the case. It is possible that Child A was more successful because he had more time in therapy and, perhaps, more learning opportunities and intervention. Maybe if Child A tried Child B's intervention method the child would have improved faster. The lack of unity in documenting intervention intensity makes it impossible to determine how effective an intervention is or how it compares to another intervention (Parker-McGowan *et al*., 2014). A client's time is valuable, SLPs have the responsibility to administer appropriate therapy doses, the optimal amount of time and intensity to help a client, without unnecessarily impeding on the client's daily life.

Speech-language pathology has changed a great deal within the past few decades, SLPs adapt to changing policies in special education, new technologies and methods, a greater breadth

of clients of all ages and abilities, as well as an increase in demand due to the aging baby boomer generation. With these changes comes an increase in caseloads, and therefore documentation demands, and third-party billing (Whites et al., 2007). The need for systematic treatment plan documentation increases with the demand and need to most effectively allocate SLP intervention time.

For one SLP to serve many diverse clients, he or she must be equipped with statistically fortified evidence for intervention. This can be achieved through strong rapport between researchers and SLPs. Within the past ten years, researchers observed a lack of documentation, and therefore a lack of communication, about intervention intensity, which may create a vicious cycle of lack of evidence to study and a lack of relevant research for therapists to use (Parker-McGowan *et al*. 2014; Snell Brady et al., 2010; Warren, Fey & Yoder, 2007). Common terms have been proposed (Warren et al., 2007) to help SLPs consistently specify dosage, also called "intervention intensity" or "cumulative intervention intensity" (CII) in treatment plans (See Table 1) . It was suggested that SLPs and researchers use an equation to combine different parameters of intervention intensity to produce a value to compare the intensities of different methods The value of cumulative intervention intensity is calculated by multiplying dose by dose frequency by total intervention duration (Warren el al., 2007; See Table 2).

Five years after publishing these terms, Warren and colleagues collaborated to discuss practical flaws in implementing the terms in treatment plans such as the ambiguity of Warren's terms and the variable therapy goals, environments, and personal needs of each client (Yoder et al., 2012). The more variable the clients are, the harder it is to document common characteristics for research.

Warren and colleagues observed that when documenting intervention intensity, it is important to indicate the complexity of the task (Yoder et al., 2012). Measuring intervention intensity, that is the support and practice opportunities in therapy, is more subjective than medicinal dosage measurements and is therefore more difficult to calculate in a systematic way. It is not adequate to simply state the number of learning opportunities. For example, a client presented with twenty challenging opportunities per therapy session experiences a more intense intervention than a client presented with twenty simple learning opportunities per therapy session. In speech-language pathology, an increase in both the amount and complexity of tasks will increase the intervention intensity. The complexity of the task depends on many variables such as the environment and level of support from the SLP. The researchers acknowledge that it is very difficult to objectively describe intervention intensity. Warren and colleagues speculate that; therefore, it is difficult to determine how intervention intensity correlates with how quickly the client responds to treatment (Yoder et al., 2012).

Generalizing and maintaining skills tends to be superior when SLPs administer learning opportunities in small increments frequently rather than all at once (Yoder et al., 2012). For example, a child receiving therapy might benefit more from twenty minutes of therapy three times a week rather than an hour of therapy once a week. This difference is not reflected in the cumulative intervention intensity equation. After analyzing the terms created in 2007, Warren and colleagues acknowledged that the equation would not help distinguish the difference between “massed” and “distributed” therapy (Yoder et al., 2012).

ASHA has set standards for researchers and SLPs since 1952 (ASHA, 2017) and SLPs already follow standards when making treatment plans. As part of the ASHA model for evidence-based practice, therapy sessions must adjust to the individual client’s needs (ASHA,

2017). If the client is not paying attention in therapy he or she is not receiving the intervention. The client's attention span needs to be acknowledged for every test and therapy session to determine intensity (Parker-McGowan et al., 2014). The type of disorder the client has should influence the treatment his or her SLP prescribes. Yoder, Fey, Warren and Woynarski (as cited in Yoder et al., 2012) found that children with Down syndrome responded differently to varying intervention intensities than the control group. These aspects may also affect dosage.

There is a consensus among researchers in speech-language pathology that calculating intervention intensity is important but challenging due to issues of clarity, time, and variability between clients and treatments. Warren and colleagues acknowledged that their model of calculating dosage was flawed, but are still a valuable starting point when computing intervention intensity (Yoder et al., 2012). However, the current baseline of documenting intervention intensity in speech-language pathology to support evidence in clinical practice leaves something to be desired. When Warren and colleagues created the intervention intensity parameter model they intended to give therapists a foundation to start calculating intervention intensity (Warren et al., 2007). The purpose of this present study was to examine the extent to which intervention intensity parameters proposed by Warren and colleague's (Warren et al., 2007) were already documented in speech-language pathology treatment plans in educational and medical settings.

Method

Researchers completed Collaborative Institutional Training Initiative (CITI) Program training and obtained approval from the Institutional Review Board. The data collection was completed in collaboration with one faculty member and two graduate students in the Communication Sciences and Disorders Program at the University of Minnesota Duluth, as well

as the author of this paper. Together, this team reviewed over 5000 pages of SLP intervention plans. These included case files of 217 individuals who received treatment within the last 22 years. Of these, 76 individual client files contained documentation from either educational or medical settings. Some individual case files contained multiple documents from educational or medical settings. In sum, a total of 120 records were located and analyzed, including 46 educational SLP intervention plans and 74 medical SLP intervention plans.

An Excel spreadsheet with a code book was created and individual data from these 120 records was systematically extracted. Data was mined from the excel sheet for this independent capstone project that focused on Warren and colleagues' model for calculating intervention intensity. Different data was mined from the excel sheet for the independent projects completed by other members of the data collection team. For this project, the following parameters were recorded: type of documentation; client gender; client age at the time of service; medical diagnosis; communication diagnosis; and intervention intensity. A coding system was used so personal health information (PHI) was never documented. Routine reliability checks were made by student researchers, meaning that each document was reviewed by at least two researchers separately. Reliability checks were made by supervisor, Dr. Jolene Hyppa-Martin.

Terms were defined to ensure consistency between multiple researchers. See Table 4. For example, if an SLP documented that the client would receive intervention "twice a week", that would be an example of *Dose Frequency.* However, "60 minutes per week" would not be documented as a parameter of CII because it is not specific. A client who undergoes an hour of a specific intervention will have a different experience than a client who receives ten minutes of that intervention six days a week. Thus "2 times per week for 45 minutes" would only count for *Dose Frequency* because it does not specify the *Dose*. Specifying the amount of time during the

therapy session does not convey how many learning opportunities the SLP plans to provide during that session. An SLP who reported that therapy will be "twice a week for 15 indirect and 30 direct minutes for 15 weeks" would document both *Dose Frequency* and *Total Duration.* Data pertinent to intervention intensity was extracted and coded.

Results

Educational Records

The educational records included 39 Individualized Educational Plans (IEPs) and 7 Individual Interagency Intervention Plans (IIIPs) from public schools in northern Minnesota and northwestern Wisconsin. The dates of treatment spanned over 22 years (1994 through 2016). The clients' ages at the time of documentation ranged from 2 years and 11 months to 20 years. There were 29 male and 17 female individuals. Of these records 65% specified *Dose Frequency* and 28% specified *Total Duration*. None of these plans included *dose* or *dose form*.

Medical Records

There were 74 medical records from settings in northern Minnesota and northwestern Wisconsin. The dates of treatment spanned over 18 years (1997 through 2015). The clients' age at the time of documentation ranged from 2 years 5 months to 73 years. There were 41 males and 33 females. Of these of these records 69% specified *Dose Frequency* and 55% specified *Total Duration*. None of these plans included *dose* or *dose form*.

Discussion

The purpose of this project was to examine the extent to which intervention intensity parameters are present in speech-language pathology treatment plans in educational and medical settings. Findings suggest that no intervention plans reported all dosage parameters of cumulative intervention intensity. Neither medical nor educational SLPs included dose nor dose

form in their plans. Most SLPs in both settings reported dose frequency and most SLPs in medical settings report total duration. Conversely, less than one-third of the SLPs in educational settings reported total duration.

It is possible that SLPs do not extensively document intervention intensity in treatment plans because they understand that a client's needs and receptivity to intervention is fluid throughout the total duration of the treatment. It is also possible that SLPs document intervention intensity elsewhere, such is in treatment notes which were not reviewed for this study. It is also possible that SLPs who excluded intervention intensity in treatment plan may include intervention intensity in other documents such as final evaluations. Another possibility is that SLPs do not document intervention intensity anywhere.

A major aspect of evidence-based practice is responding to the needs of the client (Evidence-Based Practice, 2017). Professionals in the field of speech-language pathology could benefit from charting intervention information in one document. SLPs could use information they may already document to synthesize a separate document with information about how much intervention was prescribed from the treatment plan and how much intervention was administered from the daily notes and the final evaluation. Creating a single document recording the intervention intensity for prescribed may help SLPs learn from each client's process, researchers may be equipped to provide evidence for the quality of innovative treatment methods, and insurance companies might have more evidence to cover therapy methods.

Inciting SLPs to document dosage parameters in one location may require a great deal of collaboration. Therapists ought to converse about how the meaning behind Warren's terms matters more than the terms themselves. SLP's write with an audience in mind and it is very appropriate to write treatment plans with and for families. But mandating that a separate

document to specify prescribed intervention intensity may foster collaboration between professionals to discover and implement evidence-based practice.

After analyzing the trends of SLP intervention intensity documentation in northern Minnesota and northwestern Wisconsin, an example template for documenting intervention intensity was created. Table 5 represents one phrase that would represent the intervention intensity of a specific therapy method well.

This change will require time and, as every SLP knows, time is precious. But evidence regarding the optimal intensity and duration of methods may prevent clients from not receiving enough care or spending so much time in therapy that they lack the opportunity to practice skills in real world settings. SLPs share a common goal to facilitate skills to help clients enjoy independence as soon as possible. Documenting intervention intensity in one document might enable therapists to more confidently create and implement personal plans for clients and build a legacy of excellent evidence-based practice for the field of speech-language pathology.

References

American Speech Language and Hearing Association (ASHA; 2017). *Evidence-Based Practice.* Retrieved from http://www.asha.org/Research/EBP/

American Speech Language and Hearing Association (ASHA; 2017). *History of ASHA.* Retrieved from http://www.asha.org/about/history/

Billingsley, F. (1984). Where Are the Generalized Outcomes? (An Examination of Instructional Objectives). *Journal of the Association for Persons with Severe Handicaps (JASH)*, *9*(3), 186-92.

Parker-McGowan, Q., Chen, M., Reichle, J., Pandit, S., Johnson, L., & Kreibich, S. (2014). Describing Treatment Intensity in Milieu Teaching Interventions for Children with Developmental Disabilities: A Review. *Language, speech, and hearing services in schools*, 45(4), 351-364.

Piantadosi, S. 1997. *Clinical trials: A methodologic perspective*. New York, NY: Wiley.

Snell, M., Brady, N., McLean, L., Siegel, E., Sylvester, L., Mineo, B., Paul, D., Romski, M, Sevik, R. (2010). Twenty Years of Communication Intervention Research with Individuals Who Have Severe Intellectual and Developmental Disabilities. *American Association on Intellectual and Developmental Disabilities*, 114(5), 364-380.

Warren, S., Fey, M., & Yoder, P. (2007). Differential treatment intensity research: A missing link to creating optimally effective communication interventions. *Mental Retardation and Developmental Disabilities Research Reviews*, 13, 70–77.

Whites, M., Anderson, C., Hinsz, A., Kalar, A., Krippner, D., Kuehn, M., Murdy, S. (2007). *A Multi-Year Perspective on Challenges in Speech-Language Pathology.* Retrieved from http://www.asha.org/about/history/

Yoder, P, Fey, M. & Warren, S. (2012). Studying the impact of intensity is important but complicated. *International Journal of Speech-Language Pathology*, 14, 410-413.

Yoder, P. Fey, M. Warren, S. & Woynarski, T (2012). Dose frequency, Down syndrome, and vocabulary. Manuscript in preparation.

Table 1

Definitions of CII cited from Warren and Colleagues

Terms	Definitions
Dose	"The number of properly administered teaching episodes during a single intervention session"
Dose Form	"The typical task/activity/context/ within which the teaching episodes are delivered"
Dose Frequency	"The number of times a dose of intervention is provided per day and per week."
Total Intervention Duration	"The time period over which a specified intervention is presented"
Cumulative Intervention Intensity (CII)	"The product of Dose X Dose Frequency X Total Intervention Duration" (CII= "dosage")

These terms were cited from Warren, S. F., Fey, M. E., & Yoder, P. J. (2007). Differential treatment intensity research: A missing link to creating optimally effective communication interventions. Mental Retardation and Developmental Disabilities Research Reviews, 13, 70–77.

Table 2

Example of computing cumulative intervention intensity.

Treatment	Example	Cumulative Intervention Intensity Equation
Treatment One	"25 opportunities will be provided through milieu teaching approach for 45 minutes, twice a week, for four weeks."	25 x 2 x 4 = 200
Treatment Two	"15 opportunities will be provided through a drill approach in 20 minute sessions, three times a week, for four weeks,"	15 x 3 x 4= 180

According to Warren and colleague's equation (Warren et al., 2007), Treatment one has a higher intervention intensity.

Table 3

Definitions and Examples of Cumulative Intervention Intensity Parameters modeled after Warren and Colleagues:

Definitions and Examples of Cumulative Intervention Intensity Parameters modeled after Warren and Colleagues:

Terms	Definitions and Examples
Dose	number of teaching episodes per session (ex: 30 opportunities)
Dose form	context in which the teaching episodes are delivered (ex: milieu teaching approach, direct cueing, indirect cueing)
Dose frequency	number of times a dose is provided per day or per week (ex: 3/day; 2/week)
Total Duration	total time over which a specified treatment is presented (ex: for 15 weeks, for 1 year)

These terms were used as a reference to collect data from individual client files. These terms are adaptations of terms from Warren, S. F., Fey, M. E., & Yoder, P. J. (2007). Differential treatment intensity research: A missing link to creating optimally effective communication interventions. Mental Retardation and Developmental Disabilities Research Reviews, 13, 70–77.

Table 4

Coding Table Example Indicating the Presence of Each Parameter (ex. Dose, Dose Form, Dose Frequency, and Total Duration) in examined intervention plans. X denotes the presence of a parameter.

	Examples of Extracted Data from Education and Medical Records			
Terms	2/week	2/week for 15 indirect and 30 direct minutes for 1 year	60 minutes/week	2/week for 45 minutes
Dose				
Dose Form				
Dose	X	X		X
Frequency				
Total		X		
Duration				

Table 5

Example of a document with all intervention intensity parameters.

"25 opportunities will be provided through milieu teaching approach for 45 minutes twice a week, for 4 weeks"		
Intervention Intensity Parameter	Definition	Inclusion in Example
Dose	Number of teaching episodes per session	"25 opportunities"
Dose Form	Context in which teaching episodes are delivered	"milieu teaching approach"
Dose Frequency	Number of times a dose is provided per day and/or per week	"twice a week "
Total Duration	Total time over which a specified treatment is presented	"for 4 weeks"